

ORACLE®

## Oracle VDI Exam Study Guide

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## Symbols, Acronyms & Initialisms

Common abbreviations used throughout the study guide

<b>Appliance Link Protocol</b>	ALP
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<b>Command Line Interface</b>	CLI
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<b>Microsoft</b>	MS
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<b>Oracle Partner Network</b>	OPN
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<b>Oracle Virtual Desktop Client</b>	OVDC
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<b>Oracle Virtual Desktop Infrastructure</b>	Oracle VDI
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<b>Remote Desktop Connection</b>	RDC
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<b>Remote Desktop Protocol</b>	RDP
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<b>Virtual Machine</b>	VM
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<b>VirtualBox Remote Desktop Protocol</b>	VRDP
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## Study Guide Overview

The purpose of this guide is to help you prepare for the Oracle Partner Network exam for Oracle Virtual Desktop Infrastructure specialization. The guide is broken into topics that are covered by the exam. Each topic will contain a summary of the important parts of the topic, along with sample questions that demonstrate the level of question that will be asked on the exam. At the end of the guide is a section that highlights links to additional study resources that we recommend you review prior to taking the exam.

### Topics

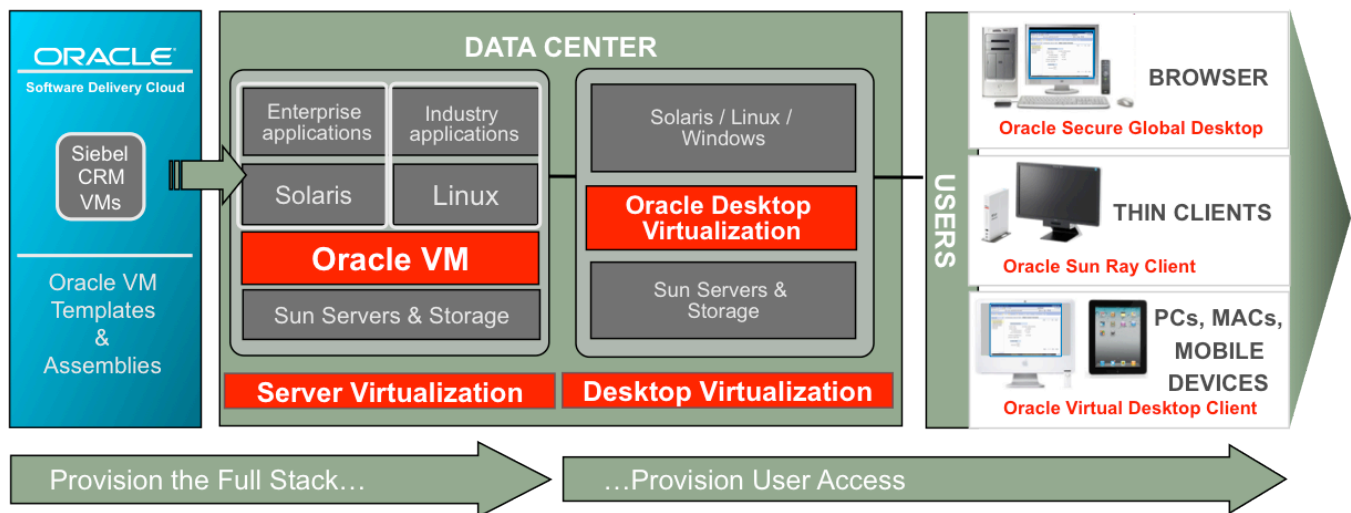
- Introduction to the Oracle Virtual Desktop Infrastructure
- Protocols and Devices
- Installing the VDI Core
- The VDI Center
- Desktop Providers
- Database & Storage
- Pools, Desktops and Cloning
- Client Access
- Oracle VDI Advance Topics
- Backup and Restore

## Introduction to the Oracle Virtual Desktop Infrastructure

Oracle Virtual Desktop Infrastructure (VDI) provides access to virtualized desktops hosted in a data center. Oracle VDI can provide a complete desktop provisioning and delivery service by:

- Creating, running, managing, and storing virtual machines.
- Authenticating users, and connecting them to their virtualized desktops.
- Enabling client devices to display virtualized desktops.

Figure 1 shows how Oracle VDI is able to provide a complete end-to-end solution, from the client to the storage.



## Application-Driven Virtualization

Figure 1

### Exam Preparation

This topic will pose questions that:

- Ask about the architecture and benefits of the Oracle VDI solution,
- cover the deployment of desktops with Oracle VDI

### Sample Question Content

1. Due to the way the Oracle VDI architecture was designed, it allows for the hardware and software interoperability with other solutions. Each layer uses a different technology to complete the OVDI solution. Because this is data center technology, how could it help solve some traditional desktop challenges?
2. The Oracle VDI architecture has multiple deployment use cases, spanning multiple guest VM operating systems. What guest operating systems are supported?

## Useful links

[Introduction to Oracle VDI](#)

[Desktop to Datacenter white paper](#)

## Protocols and Devices

With Oracle VDI, desktop sessions always run on the virtualization host and never on the client devices. Users can access their desktops using any of the following clients:

Oracle Sun Ray Clients, including Oracle Virtual Desktop Clients

Remote Desktop Protocol (RDP) clients, including secure web access using Oracle Secure Global Desktop

Web services clients, typically web applications

The VDI Service handles all requests for access to a desktop. Once a user has a desktop, the RDP protocol is used to connect to, and display, the desktop session.

## Exam Preparation

This topic will pose questions that:

- Ask about the challenges of remote display and networks
- Query the capabilities of ALP, VRDP, and the Sun Ray enhancements to the Remote Desktop Protocol (RDP)

## Sample Question Content

1. You will find many challenges when trying to remote display a desktop environment. Everything from the protocol to the network can change how the users perceive their desktop environment. How does the ALP protocol address these challenges?
2. The Sun Ray Software and Oracle VirtualBox use high performing protocols, which give it many advantages when architecting a desktop solution. What are the protocols used, and how can they be leveraged?

## Useful Links

[Desktop Access - General](#)

[Desktop Access - Detail](#)

## Installing the VDI core

On Oracle Linux hosts, the installation script checks whether the required packages for Oracle VDI are installed. If any required packages are missing and yum is configured correctly, the installation script prompts you to continue and installs the missing packages. If the required packages are not installed, the installation fails.

At the end of the installation, you are prompted to configure Oracle VDI.

You can configure Oracle VDI on a host in the following circumstances:

- As part of the software installation, immediately after installing or updating the Oracle VDI software on a host.
- As a separate step, after installing or updating the Oracle VDI software on a host.
- As a separate step, after un-configuring Oracle VDI on a host.

### Exam Preparation

This topic will pose questions that:

- Cover system requirements
- Ask about Oracle VDI high availability technologies
- Cover the installation and configuration of the VDI core

### Sample Question Content

1. System requirements play a major role in how successful the deployment will be. What are the system requirements for...?
2. Learning to install and configure the Oracle VDI core installation will be first step of the deployment. What are the different options available when installing the core?

### Useful Links

[Installing Oracle VDI](#)

[Oracle VDI 3.4 Getting Started Guide](#)

## The VDI Center

Typically user information is already stored in an Active Directory or LDAP server. Before you can create pools and assign users to desktops, you must configure the desired Active Directory/LDAP server and the Oracle VDI. The following information describes the user directory types supported by Oracle VDI.

Active Directory integration is the recommended choice for production platforms integrating with Microsoft Active Directory. Active Directory integration requires additional configuration (Kerberos configuration and time synchronization) on the Oracle VDI hosts.

LDAP integration is the recommended choice for integrating with other types of LDAP directories or to set up Active Directory integration quickly. The setup is straight-forward, without the need for extra configuration.

### Exam Preparation

This topic will cover questions that:

- Describes the user directory integration
- Ask about configuring the user directory
- Refer to configuring Kerberos for MS Active Directory

### Sample Question Content

1. User Integration is an important part of the Oracle VDI solution. What are the different directory services used by Oracle VDI?
2. Configuring the User Directory integration in Oracle VDI is not complicated, but it's important to get all the preliminary steps done first before you start. Why is this?

### Useful Links

[Companies and User Directories](#)



## Desktop Providers

Oracle VDI does not restrict you to a single virtualization platform. You can use a mixture of desktop provider types and create as many desktop providers as you need. How Oracle VDI interacts with a desktop provider depends on the provider type.

### Hypervisor-Based Desktop Providers

The following are the available hypervisor-based desktop providers:

- Oracle VM VirtualBox
- Microsoft Hyper-V
- VMware vCenter

### Session-Based Desktop Providers

The following are the available session-based desktop providers:

- Microsoft Remote Desktop
- Sun Ray Kiosk
- Generic

## Exam Preparation

This topic will cover questions that:

- Generally refer to the different Desktop providers, their roles and characteristics
- Ask about installation and configuration of the Oracle VM VirtualBox Desktop Provider
- Refer to the creation of VirtualBox VM templates

## Sample Question Content

1. The Desktop Provider role is unique to Oracle VDI. The broker was designed to support different hypervisors as well storage and networking. What are the supported hypervisors?
2. Desktop Providers, like the primary hosts, need to be configured and sized correctly. Why is this?
3. Oracle VirtualBox is the default hypervisor that comes bundled with Oracle VDI. How is it installed?

## Useful Links

[Desktop Providers](#)

## Storage & Database

### Storage

Storage is closely related to virtualization because usually a desktop provider requires somewhere to create and store the virtual disks used for desktops. The storage requirements depend on the desktop provider type.

The Oracle VM VirtualBox and Microsoft Hyper-V desktop providers require storage. Oracle VDI supports local disks, network file system shares, iSCSI storage devices, and Zettabyte File System (ZFS) storage pools. The storage that can be used depends on the desktop provider type and operating system of the virtualization hosts.

VMware vCenter desktop providers also require storage but the storage is managed by the VMware infrastructure. However, Oracle VDI is able to query vCenter for the available storage, and can select the data store to use when creating virtual disks.

For all other desktop providers, storage is managed independently of Oracle VDI. For the desktop providers that require storage, Oracle VDI is able to monitor the available free space and current workload. If multiple storage servers are configured, Oracle VDI uses this information to balance the load.

### MySQL Database

Oracle VDI requires a MySQL database to store configuration and run-time information. When you configure an Oracle VDI Center, you can choose to use the embedded MySQL Server database that is included with the Oracle VDI software, or you can use your own MySQL database.

If you use the embedded MySQL Server database, the primary host in the Oracle VDI Center runs the Oracle VDI master database. To provide for high availability, a secondary host in the Oracle VDI Center runs a slave database that receives replication updates from the primary host. If the primary host becomes unavailable, the Oracle VDI Center Agent automatically promotes the secondary host to become the primary host, and its database becomes the master database. If you use your own MySQL database, you must make your own provision for high availability.

The configuration data stored in the database includes the information about user directories and tokens, desktop information such as desktop providers, pools, templates, and storage. The run-time information includes information about the users that are logged in, the desktops they are using, the state of the desktops, and details of cloning jobs that are running.

## Exam Preparation

This topic will cover questions that:

- Ask about the default database configuration
- Refer to configuring VDI to use unified storage

## Sample Question Content

1. Oracle VDI uses an embedded MySQL server for its' database. Is it important to know how to set this up when building a VDI Center?
2. Oracle VDI supports a number of different storage providers and protocols. What are the supported protocols?

## Useful Links

[Storage](#)

[Database](#)

## Pools, Desktops and Cloning

Oracle VDI organizes desktops in pools. A pool is a collection (or container) of desktops. Typically you will create different pools for different types of users. For example, the engineering team in your company might have different desktop requirements than the marketing department.

For Oracle VM VirtualBox and Microsoft Hyper-V desktop providers, the following pool types are available:

- **Dynamic** pools are filled with cloned flexible desktops. If you choose the Dynamic Pool type, the desktops in the pool will be temporarily assigned to users. They will be recycled each time the user logs out. This pool type is considered dynamic because the user-desktop assignments are often changing.
- **Growing** pools are filled with cloned personal desktops. If you choose the Growing Pool type, the desktops in the pool will be permanently assigned to users. Users can log in and out without losing their desktop settings. The desktops are not recycled.
- **Manual** pools are initially empty. They are filled manually by importing personal desktops. The Manual Pool type should be used if cloned desktop assignment is not an option.

The desktop states are used to accomplish the following:

- Implement the desktop lifecycle.
- Synchronize Oracle VDI hosts and virtualization platform.
- Serve as a tool for monitoring and analyzing the system state.

The following figure depicts a simplified version of the lifecycle of a flexibly assigned desktop.

### Lifecycle of a Flexible Assigned Desktop

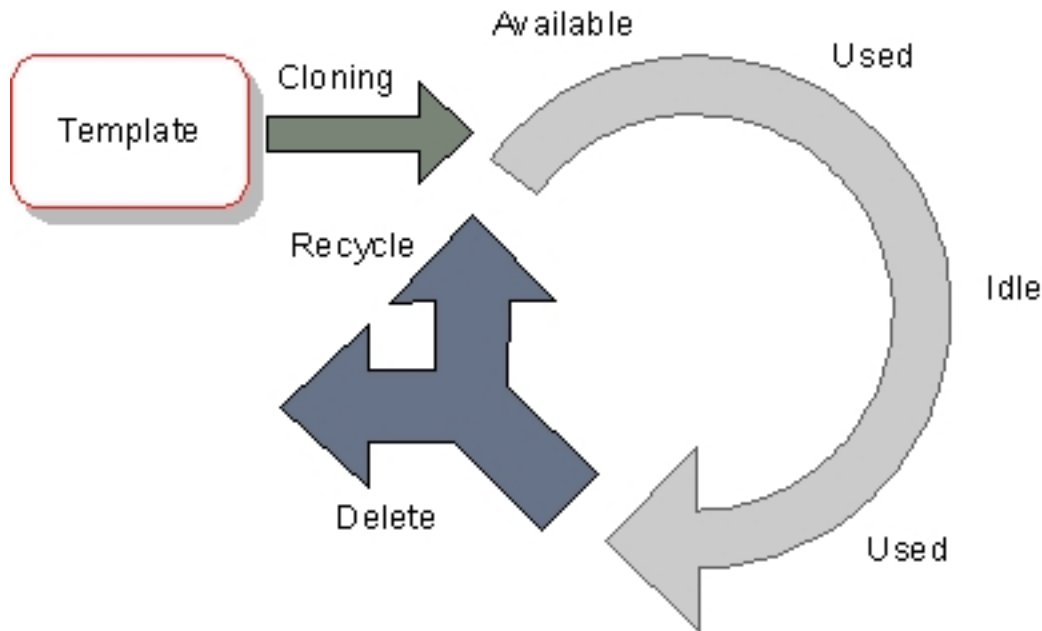


Figure 2

Possible desktop states are:

- **Available**
- **Idle**
- **Used**
- **Reserved**
- **Unresponsive**

### Exam Preparation

This topic will cover questions that:

- Ask about Oracle VDI pool types and their role
- Refer to desktop life-cycles and desktop states
- Ask about the pool creation and population process

## Sample Question Content

1. To make it more manageable for administration purposes, Oracle VDI organizes desktops in what is called pools. What are the available pool types?
2. The concept of creating virtual desktops deals with a desktop lifecycle and state. What is a desktop state?
3. After the core OVDI infrastructure has been created, one of biggest tasks that the administrator will need to perform is provisioning desktops. How do you import a desktop into the Oracle VDI software?
4. The use of templates makes it easier to perform and control administrative tasks. What constitutes a “master” in templates?

## Useful Links

[Desktop Pools](#)

[Desktop States](#)

[Cloning Desktops](#)

## Client Access

Users can access their virtual desktops from two types of clients, Sun Ray Clients and Remote Desktop Protocol (RDP) clients.

Sun Ray Clients, whether traditional hardware clients or Oracle Virtual Desktop Clients, connect to Sun Ray Software over the Oracle Appliance Link Protocol (ALP). Under Oracle VDI, Sun Ray Software runs on the Oracle VDI host and includes the Oracle VDI kiosk session and the Sun Ray Windows connector. The kiosk session connects Sun Ray users to Oracle VDI, and the Sun Ray Windows connector completes the connection to the virtual desktops.

The RDP protocol was developed by Microsoft as a way to establish secure connections between servers and remote clients. Oracle VDI includes a built-in RDP broker that enables RDP clients to access virtual desktops. These RDP clients include the Oracle Secure Global Desktop RDP client and Microsoft Remote Desktop Connection (RDC).

## Networking

The following is a list of the types of network traffic created by Oracle VDI. The list is ordered by bandwidth requirements, with highest bandwidth requirement listed first:

- iSCSI traffic between VirtualBox and Microsoft Hyper-V virtualization hosts and storage hosts
- RDP traffic between Oracle VDI hosts and virtualization hosts
- ALP traffic between Sun Ray Clients and Oracle VDI hosts
- RDP traffic between the RDP clients and Oracle VDI hosts or virtualization hosts
- Database replication traffic between the master and slave database hosts in an Oracle VDI Center, or between the primary Oracle VDI host and the external database, if an external database is used

SSH and HTTPS traffic between Oracle VDI hosts and storage hosts, or between Oracle VDI hosts and virtualization hosts

## Exam Preparation

This topic covers questions that:

- Refer to how users access their desktops
- Ask about network basics and best practices
- Refer to the different Sun Ray clients, including the OVDC client
- Ask about the role played by the Sun Ray Server software in Oracle VDI

## Sample Question Content

1. Oracle VDI presents an almost agnostic approach to the users desktop client. What are the different Oracle Sun Ray clients that can be used to connect to Oracle VDI?
2. Oracle Sun Ray Server software is a embedded component of the Oracle VDI. What role does the Oracle Sun Ray Server Software provide?

## Useful Links

[Desktop Access](#)

[Networking](#)

## Oracle VDI Advanced Topics

### Maintenance Mode

On occasion, you might need to off-line a configured host or storage, including maintenance, upgrades, and decommissioning. The Maintenance Mode feature allows virtual machines to be cleared from a currently used host or storage and moved to a different host or storage so that normal operations may continue while the initial host or storage is unavailable. This process is also considered a "cold" migration because running virtual machines will be suspended to allow the maintenance process to proceed.

Maintenance mode is available for Oracle VM VirtualBox and Microsoft Hyper-V desktop providers **only**.

### Storage Maintenance

Oracle VDI provides a mechanism to put one or more storage servers in maintenance mode. Maintenance mode implies that the storage server is disabled and all running desktops are either shutdown or suspended. At this point, maintenance can take place on the storage server (reboot or upgrade). No data is moved or deleted from the specified storage server (including desktop hard disk data), but the associated OCFS2 file systems (iSCSI or Sun ZFS storage types) are unmounted from the virtualization hosts. When the storage server is re-enabled, the OCFS2 file systems are remounted on the virtualization hosts, and any desktops suspended as a result of entering maintenance mode are resumed.

### **Multiple Monitor Capability**

Sun Ray Software enables the display of a single Sun Ray session across multiple monitors or of multiple Sun Ray sessions on separate monitors. Oracle VDI extends this capability to the display of virtual Windows XP or Windows 7 desktops.

### **Multiple Desktop Selection**

The Desktop Selector enables the user to select and connect to multiple desktops, provided that user has a Sun Ray Client with two monitors and has been assigned two or more virtual desktops.

### **Assign Tokens to Users**

In a Sun Ray environment, users may take advantage of smart cards (tokens) to initiate a session on a Sun Ray Client. With Oracle VDI, you can assign a token to a user. It is also possible to assign desktops directly to specific tokens. Once tokens have been created, they can be assigned to pools and desktops.

### **Pool Sun Ray RDP Settings**

The Sun Ray Windows connector supports a wide range of options for configuring RDP connections to users' desktops.

Oracle VDI enables you to configure a subset of these options for a pool.

## **Exam Preparation**

This topic covers questions that:

- Refer to the maintenance and monitoring of the hypervisor and storage hosts
- Ask about configuring multi-head and multi-monitor features
- Ask about tokens and how they're assigned to users
- Refer to the Oracle VDI CLI
- Ask about the Sun Ray RDP Settings in the Pools Tab.

## **Sample Question Content**

1. The advanced topics cover the deeper administration aspects of Oracle VDI. How would you go about setting the Desktop Provider hosts and storage in maintenance mode?
2. What is the difference between multi-monitor and multi-head features?

## **Useful Links**

[Maintenance Mode](#)

[Multi-monitor feature](#)

[Assigning tokens](#)

[Sun Ray RDP Settings](#)

## Backup and Restore

### Backing Up and Restoring the Oracle VDI Database

As with all user-level data, it is important to back up the Oracle VDI database periodically. This is also a crucial step if you plan to reinstall an Oracle VDI host.

Here is a list of important notes when backing up and restoring the Oracle VDI database.

- For multi-host setups, the backup and restore process should only be done on one host. It does not need to be done on every host.
- You can perform the backup and restore tasks on different hosts as long as the archived backup is accessible.
- The backup job stops all other Oracle VDI jobs. Jobs are automatically started again after the backup finishes.
- The restore job stops the entire Oracle VDI system, but active sessions will continue to run. When a restore job finishes, you must restart the Oracle VDI system (through the Common Agent Container (cacao) on all hosts.

### Exam Preparation

This topic covers questions that:

- Ask how to backup the VDI database
- Refer to exporting templates and personal hard disks
- Query how to use the maintenance mode feature for the VirtualBox host and storage components

### Sample Question Content

1. Oracle VDI has a command that allows you to backup the VDI Database. What is the backup command?
2. How do you restore a Oracle VDI database?

### Useful Links

[Backing Up Oracle VDI Database](#)



## **Additional Study Resources**

[Oracle Desktop Infrastructure Administrator's Guide](#)

[Oracle Desktop Infrastructure Getting Started Guide](#)

[Sun Ray Software Administration Guide](#)

[Oracle VM VirtualBox User Manual](#)

[Oracle Virtual Desktop Infrastructure Main Page](#)